

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
15 September 2005 (15.09.2005)

PCT

(10) International Publication Number  
**WO 2005/084827 A1**

(51) International Patent Classification<sup>7</sup>: **B07C 5/36**

(21) International Application Number:  
PCT/GB2005/000647

(22) International Filing Date: 22 February 2005 (22.02.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
0404617.3 2 March 2004 (02.03.2004) GB

(71) Applicant (for all designated States except US): **QINETIQ LIMITED** [GB/GB]; 85 Buckingham Gate, London SW1E 6PD (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **COWLING, Donald** [GB/GB]; QinetiQ Bincleaves, Bldg PK2, Newtons Road, Weymouth, Dorset DT4 8UR (GB). **STINCHCOMBE, Darren** [GB/GB]; QinetiQ Bincleaves, Bld 49 Rm 5, Newtons Road, Weymouth, Dorset DT4 8UR

(GB). **GALLIVER, Wesley, John** [GB/GB]; QinetiQ Bincleaves, Bld 49 Rm 5, Newtons Road, Weymouth, Dorset DT4 8UR (GB). **TAKEL, George, Nicholas** [GB/GB]; Bowman Process Technology Limited, 100 Beulah Road, Cardiff CF14 6LZ (GB).

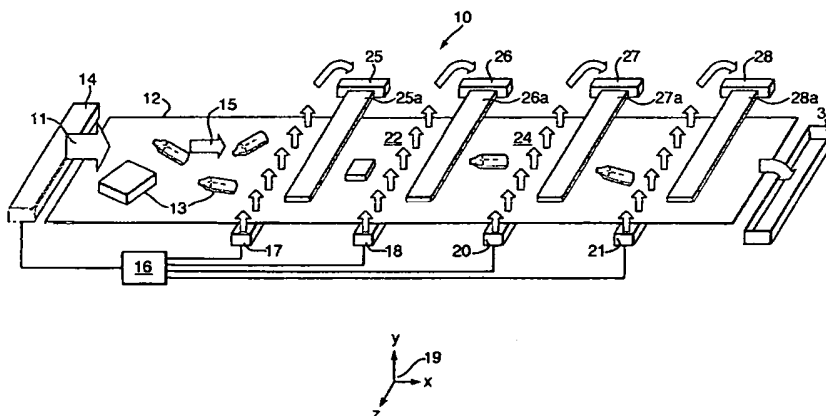
(74) Agent: **TOCHER, A., J.**; QinetiQ Limited, Intellectual Property, Cody Technology Park, Ively Road, Farnborough, Hants GU14 0LX (GB).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,

[Continued on next page]

(54) Title: SEPARATING DEVICE AND SORTING APPARATUS WITH TWO-DIMENSIONAL ARRAY OF NOZZLES AND METHOD OF SORTING OBJECTS



(57) Abstract: Sorting apparatus (10) comprising conveying means (12) for conveying input objects (13) input to the apparatus, extraction means (17, 18, 20, 21) for extracting from the conveying means input objects identified as belonging to a particular object-class and processing means (16) arranged to receive input data corresponding at least to the positions across the conveying means of said identified input objects and to output control signals corresponding to the input data to the extraction means to effect extraction of said identified input objects, wherein the extraction means comprises an array of nozzles extending in a direction (z) across the conveying means, each of which is independently operable under control of the processing means to produce an air jet in a generally upward direction (y), and is arranged to activate sub-groups of nozzles corresponding to, and in response to, said control signals, characterised in that the conveying means has a partially open surface (12) arranged to convey input objects over the array of nozzles, in that the array of nozzles is two-dimensional and also extends in a direction (x) substantially parallel to the direction of motion of the conveying means when the apparatus is in use; and in that the input data further corresponds to the outline shapes of said identified input objects.



FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,  
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,  
GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— *with international search report*

**Declaration under Rule 4.17:**

— *of inventorship (Rule 4.17(iv)) for US only*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*